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Link

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(54) **HAND-HELD VIDEO GAME PLATFORM EMULATION**

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(52) **U.S. Cl.**
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(58) **Field of Classification Search**
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See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,481,529	A	11/1984	Kerling
4,516,777	A	5/1985	Nikora
4,542,903	A	9/1985	Yokoi et al.
4,628,304	A	12/1986	Bottiau
4,756,528	A	7/1988	Umashankar
4,771,279	A	9/1988	Hannah
4,858,930	A	8/1989	Sato
4,903,218	A	2/1990	Longo et al.
4,922,420	A	5/1990	Nakagawa et al.
4,924,413	A	5/1990	Suwannukul

(Continued)

FOREIGN PATENT DOCUMENTS

EP	0 960 637	7/2000
JP	63-242293	10/1988

(Continued)

OTHER PUBLICATIONS

Readme.txt "Gameboy 98" v0.05c [online]. Jan. 9, 1999 [retrieved on Jun. 26, 2013]. Retrieved from the internet: <URL:http://www.zophar.net/gb/gameboy98.html>.*

(Continued)

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(57) **ABSTRACT**

A software emulator for emulating a handheld video game platform such as GAME BOY®, GAME BOY COLOR® and/or GAME BOY ADVANCE® on a low-capability target platform (e.g., a seat-back display for airline or train use, a personal digital assistant, a cell phone) uses a number of features and optimizations to provide high quality graphics and sound that nearly duplicates the game playing experience on the native platform. Some exemplary features include use of bit BLITing, graphics character reformatting, modeling of a native platform liquid crystal display controller using a sequential state machine, and selective skipping of frame display updates if the game play falls behind what would occur on the native platform.

14 Claims, 33 Drawing Sheets

EXAMPLE VIRTUAL LCD CONTROLLER STATE MACHINE